

The Indy VA Clinical Workstation: Real Movement Toward an Electronic Medical Record

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Background. Medical decision making is greatly enhanced by the effective delivery of relevant patient information. While most healthcare organizations have developed extensive computer systems and databases, the prevailing method of storage, retrieval, and communication of patient information continues to be the paper medical record, despite its well known shortcomings.

The purpose of this ongoing project is to improve the availability and usefulness of clinical information in a hospital-based multispecialty outpatient clinic by developing a central repository of patient data, augmented by the ability to provide decision support, event-driven clinical alerts, and self-perpetuating clinical protocols. Clinical PC Workstations, using Delphi-based software interfaced with our legacy mainframe information system, are clustered in all patient care areas, exam rooms, and doctors offices to provide immediate and convenient access to patient information.

System. The initial development of this system began in 1993, when a nationally recognized clinical database, the Regenstrief Medical Record System (RMRS), was converted to the M (MUMPS) language. Bringing RMRS into the VA's DHCP computing environment allowed further development of the existing decision support component by the introduction of protocol-authoring and maintenance tools, event-driven clinical alerts for practitioners, and self-perpetuating clinical protocols.

In 1994, an on-line narrative browser was added that combined all clinical narratives (e.g., radiology and pathology reports, procedure reports, electronic progress notes, and discharge summaries) into one common viewing function. The following year WebMan, a WWW server integrated with the VA DHCP operating system and written in native M was introduced. This advancement provided the first "point and click" read only WEB browser interface to our clinical data repository, creating an Intranet system accessible at both the local and national VA

level. With the release of the VA's RPC broker in 1996, which allows a client-server relationship with DHCP, serious development began on the creation a virtual medical record. A new GUI provides not only all the previous read only functionality, but adds the capability for direct data entry into DHCP by practitioners, including electronic progress notes, problem lists, allergy and immunization entries, and diagnosis and billing codes.

The current version of the Clinical Workstation also provides a GUI mailman function, "point and click" software for progress note generation, and WEB browser access to an extensive library of patient education materials, clinical care guidelines, and other medical information of interest to care providers.

Evaluation. A pilot study of the Clinical Workstation began in January 1997 in one Primary Care team. Initial training requirements have been minimal for most users, averaging about 40 minutes. Response has been overwhelmingly positive, with a significant reduction in chart requests and an increase in creation of electronic progress notes. Within weeks of offering the initial production version in Primary Care, practitioners from other teams and specialties began requesting access to the Clinical Workstation software. The decision support capability of the Clinical Workstation, which performs real time reminder generation for preventive health interventions, drug-drug interactions, and changes in health status has also been well received by Primary Care providers, and is expected to significantly increase the number of preventive health interventions performed.

Conclusion: The Clinical Workstation is a Delphi-based GUI designed to make accessible our entire centralized clinical record database in one intuitive, easy to use application, provide extensive real time decision support, preserve existing practice patterns, and serve as the foundation of a total electronic medical record system.